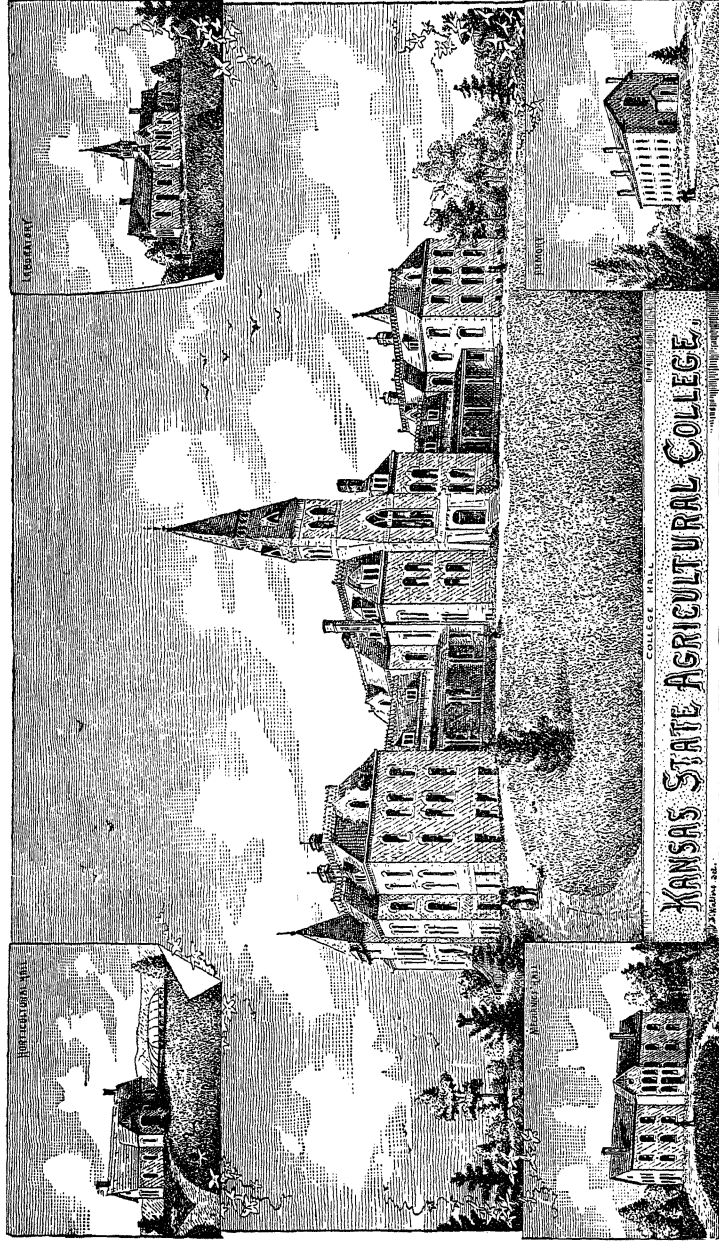


Kansas
State Agricultural College.

Catalogue, 1886-87.



TWENTY-FOURTH

ANNUAL CATALOGUE

OF THE

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OF

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Grace L. Watts,	Havensville, Pottawatomie.
Fannie E. Waugh,	McPherson, McPherson.
Frank A. Waugh,	McPherson, McPherson.
Franklin E. Way,	Talmo, Republic.
George L. Weaver,	Manhattan, Riley.
Ida M. Wells,	Irving, Marshall.
Arthur L. Whaley,	Manhattan, Riley.
Jessie Whitford,	Manhattan, Riley.
Harry N. Whitford,	Manhattan, Riley.
Elisha J. White,	Neosho Rapids, Lyon.
Wilton E. White,	Jewell City, Jewell.
Kittie S. Whitney,	Manhattan, Riley.
*Frank Wickizer,	Manhattan, Riley.
Mary Wickizer,	Manhattan, Riley.
Lewis C. Wiley,	Howard, Elk.
M. Aelzine Willey,	Tehama, Cherokee.
Stephen I. Wilkin,	Bow Creek, Rooks.
Charles D. Williams,	Silver Lake, Shawnee.
Andrew Wilson,	Winchester, Jefferson.
Arthur R. Wilson,	Columbus, Cherokee.
Clara A. Wilson,	Lawrence, Douglas.
Flora Winkler,	Winkler's Mills, Riley.
May L. Winters,	Newbury, Wabaunsee.
August C. Woerner,	Wakefield, Clay.
Lizzie H. Woerner,	Wakefield, Clay.
Perry E. Wolfley,	Edgerton, Johnson.
Alfred O. Wright,	Manhattan, Riley.
Zealous E. Wright,	Kenneth, Sheridan.
David J. Wyatt,	Cedar Point, Chase.
William R. Wyatt,	Cedar Point, Chase.
Schuyler C. Wynkoop,	Atchison, Atchison.
William R. Yenawine,	Ashland, Riley.
Charles E. Yeoman,	Lippert, Rush.
William J. Yeoman,	Lippert, Rush.

*Expelled.

Number of Students.

<i>Classes.</i>	<i>Gentlemen.</i>	<i>Ladies.</i>	<i>Total.</i>
Post-graduate,	5	5	10
Fourth-year,	20	4	24
Third-year,	33	11	44
Second-year,	57	43	100
First-year,	214	89	303
Totals,	329	152	481
From 66 counties of Kansas,			449
From 15 other States,			32

Applicants not enrolled, 35.

Average age of students in years: Post-graduate, 24.01; Fourth-year, 21.40; Third-year, 20.52; Second-year, 18.99; First-year, 19.07. General average, 19.41.

Terms and Vacations.

FALL TERM, 1887.

Wednesday, September 7th.—Examination for admission at 9 A. M.

Thursday, September 8th.—College year begins.

Friday, October 21st.—Examination.

Thursday, December 15th.—Annual Exhibition of the Alpha Beta Society.

Thursday and Friday, December 15th and 16th.—Examination at close of Fall Term.

December 17th to January 2nd.—Winter vacation.

WINTER TERM, 1888.

Monday, January 2nd.—Examination for admission at 9 A. M.

Tuesday, January 3rd.—Winter Term begins.

Friday, February 10th.—Examination.

Thursday, March 22nd.—Annual Exhibition of the Webster Society.

Thursday and Friday, March 22nd and 23d.—Examination at close of Winter Term.

SPRING TERM, 1888.

Monday, March 26th.—Spring Term begins.

Friday, April 27th.—Examination.

Monday and Tuesday, June 4th and 5th.—Examination at close of year.

June 3d to 6th.—Exercises of Commencement Week.

Wednesday, June 6th, 10 A. M.—Commencement.

June 7th to September 12th.—Summer Vacation.

FALL TERM, 1888.

Wednesday, September 12th.—Examination for admission at 9 A. M.

Thursday, September 13th.—College year begins.

OBJECTS AND METHODS.

Endowment.

An act of Congress, approved July 2d, 1862, gave to each State public lands to the amount of 30,000 acres for each of the Senators and Representatives in Congress according to the census of 1860, for the "endowment, support and maintenance of at least one college, where the leading object shall be, without excluding other scientific and classical studies, and including military tactics, to teach such branches of learning as are related to agriculture and the mechanic arts * * * in order to promote the liberal and practical education of the industrial classes in the several pursuits and professions of life."

Under this act the State of Kansas received 82,318.53 acres of land, and, in 1863, established the State Agricultural College, by endowing with these lands Bluemont College, which had been erected two miles from Manhattan under the auspices of the M. E. Church, but was presented to the State for the purpose named in the act of Congress. Of these lands, all but 160 acres have now been sold, giving a fund of \$499,786.33, which is by law invested in bonds, the interest alone being used for current expenses of the College.

In 1873 the College was reorganized upon a thoroughly industrial basis, with prominence given to practical agriculture and related sciences; and, in 1875, the furniture and apparatus of the College were moved to the farm of 215 acres, one mile from the city of Manhattan. On this fine location the State has erected buildings valued at \$115,000, of which a description is given elsewhere. The farm and grounds, furniture, stock, and other illustrative apparatus are valued at over \$100,000.

The annual income from the endowment fund—about \$35,000—meets all the expenses of instruction: the State provides, as the law requires, the necessary buildings and expenses in management of funds.

Objects.

This College now accomplishes the objects of its endowment in several ways.

First, it gives a substantial education to men and women. Such general information and discipline of mind and character as help to make intelligent and useful citizens are offered in all its departments, while the students are kept in sympathy with the callings of the people.

Second, it teaches the sciences applied to the various industries of farm, shops and home. Chemistry, botany, entomology, zoölogy, and mechanics are made prominent means of education to quick observation and accurate judgment. Careful study of the minerals, plants, and animals themselves illustrates and fixes the daily lessons. At the same time, lessons in agriculture, horticulture, and household economy show the application of science; and all are enforced by actual experiment.

Third, it trains in the elements of the arts themselves, and imparts such skill as to make the hands ready instruments of thoughtful brains. The drill of the shops, gardens, farm, and household departments is made a part of a general education to usefulness, and insures a means of living to all who make good use of it. At the same time, it preserves habits of industry and manual exertion, and cultivates a taste for rural and domestic pursuits.

Fourth, it strives to increase our experimental knowledge of agriculture and horticulture. So far as means and circumstances permit, experiments are undertaken with a view to more definite results than ordinary experience can give. By this method the students themselves are trained to more accurate observation and judgment in these practical tests of principles in farming.

Fifth, it seeks to disseminate such practical truths as have stood the test of scientific inquiry. For this purpose it publishes the weekly *Industrialist*, and issues special reports as occasion requires. Its officers also share in debates and consultations of farmers and horticulturists throughout the State. Each winter a series of six Farmer's Institutes is held in as many different counties of the State. In these the Faculty share with the people in lectures, essays and discussions upon topics of most interest to farmers. These Institutes have brought the College into more direct sympathy with the people and their work, so as to make possible a more general dissemination of the truths presented; and permanent organizations for the same purpose in many counties are increasing. Correspondence upon such questions is invited by all members of the Faculty, and applications for Institutes are desired from all parts of the State.

Course of Study.

The necessity for so adjusting various branches of a course of study that there shall be as little waste as possible in acquiring both information and discipline is felt by every teacher. Such a course is not designed to be absolutely inflexible, but to guide the judgment into some definite line of progress from which no mere whim shall turn a student aside.

Each student is expected to take three studies besides one hour's practice in an industrial art; and variations from this rule can be made only with the consent of the Faculty.

Parallel courses are offered to both sexes, with such differences as their necessities seem to call for. The following gives the general scope of the two; but fuller explanations are found under **OUTLINE OF INSTRUCTION**:—

FIRST YEAR.

FALL TERM.—Arithmetic.
English Analysis.
Geometrical Drawing.
Industrial.

WINTER TERM.—Book-keeping.
English Structure.
United States History.
Free-hand Drawing three times a week.
Industrial.

SPRING TERM.—Algebra.
English Composition.
Botany.
Industrial (Carpentry or Sewing).

SECOND YEAR.

FALL TERM.—Algebra completed.
Elementary Chemistry.
Horticulture.
Fourteen lectures in Military Science.
Industrial.

WINTER TERM.—Geometry.
Agriculture or Household Economy.
Organic Chemistry and Mineralogy.
Twelve lessons in Military Science.
Industrial (Cooking).

SPRING TERM.—Geometry completed, Mechanical Drawing.
Entomology.
Analytical Chemistry.
Industrial (Farm and Garden or Dairy).

THIRD YEAR.

FALL TERM.—Trigonometry and Surveying.
 Anatomy and Physiology.
 General History.
 Industrial (Farm and Garden).

WINTER TERM.—Mechanics.
 Agricultural Chemistry.
 Rhetoric.
 Industrial.

SPRING TERM.—Civil Engineering or Hygiene.
 Physics.
 English Literature.
 Mechanical Drawing two hours a week.
 Industrial.

FOURTH YEAR.

FALL TERM.—Agriculture or Literature.
 Physics and Meteorology.
 Psychology.
 Industrial.

WINTER TERM.—Logic, Deductive and Inductive.
 Zoölogy.
 Structural Botany.
 Industrial.

SPRING TERM.—Geology.
 United States Constitution.
 Political Economy.
 Industrial.

Industrial Training.—Closely adjusted to the course of study is industrial training in several of the arts, to which each student is required to devote at least one hour a day. Among the lines of training, each student may select, with the approval of the Faculty, except in terms when special industrials are required. Young men may have Farming, Gardening and Fruit-growing, Carpentry, Cabinet-making, Iron-work, Printing, or Telegraphy. Young women may take Sewing, Printing, Telegraphy, Floriculture, or Music.

All young men must have their industrials for one term in the carpenter shop before completing the first year; and, during the spring term of the second year and the fall term of the third year, upon the farm, gardens, and orchards. Young women take their industrial for one term of the first year in sewing, and for the winter and spring terms of the second year in the kitchen laboratory and dairy.

The Daily Routine requires chapel at 8:30 A. M. and classes from 8:50 A. M. to 1 P. M., as shown under class hours. Class rhetorical exercises are held every Wednesday. Military drill is two or three times a week. On every Friday afternoon at 1:30 all attend the public lecture or rhetorical exercises in Chapel.

CLASS HOURS, 1887-88.								
	Hrs.	FIRST YEAR.			SECOND YEAR.		THIRD YEAR.	FOURTH YEAR.
FALL TERM, Fourteen weeks.	I.	Arithmetic.		Industrials.	Horticulture.	Algebra.	General History.	Physics and Meteorology.
	II.		English.	Drawing.	Algebra.	Horticulture.	Physiology.	Industrials.
	III.	Drawing.	Arithmetic.	English.	Industrials.	Chemistry.	Trigonometry and Surveying.	Psychology.
	IV.	English.	Industrials.	Arithmetic.	Chemistry.	Industrials.	Trigonometry and Surveying.	Agriculture. Literature.
	V.	Industrials.	Drawing.		Chem. Practice. Military Science.	Chem. Practice Military Science.	Surveying Practice.	
WINTER TERM, Twelve weeks.	I.	Algebra.	Industrials.	U. S. History.	Household Economy.	Agriculture.	Mechanics.	Zoölogy.
	II.	U. S. History.	Book-keeping.	Industrials.	Chemistry 6 w'ks. Mineralogy.	Geometry.	Rhetoric.	Logic.
	III.	English Structure.	Drawing 3 times a week.	Book-keeping.	Blowpipe Analysis.	Chemistry 6 w'ks. Mineralogy.	Mechanics.	Structural Botany.
	IV.	Industrials.	English Structure.	Drawing 3 times a week.	Geometry.	Industrials.	Agricultural Chemistry.	
	V.	Drawing 3 times a week.	U. S. History.	English Structure.	Industrials.	Military Science. Blowpipe Analysis.		Industrials.
SPRING TERM, Eleven weeks.	I.	Industrials.	Composition.	Botany.	Geometry, Drawing 5 weeks.	Entomology.	Hygiene.	U.S. Constitution.
	II.	Botany.	Algebra.		Entomology.	Drawing, Geometry 5 w'ks.	Engineering.	
	III.		Botany.	Algebra.	Analytical Chemistry.	Analytical Chemistry.	English Literature.	Political Economy.
	IV.	Algebra.	Industrials.	Composition.			Physics.	Geology.
	V.	Composition.		Industrials.		Dairying.	Drawing twice a week.	Industrials.

Special Courses.—Persons of suitable age or advancement who desire to pursue such branches of study as are most directly related to agriculture or other industries, may select such studies, under the advice of the Faculty. Assaying and Pharmaceutical Chemistry may be provided for by special arrangement, when students are qualified to pursue them.

Post-Graduate Courses.—Arrangements can be made for advanced study in the several departments at any time. Special opportunities for investigation and research will be afforded at all times to resident graduates in Agriculture and Agricultural Chemistry, Physics and Chemistry, Horticulture and Botany, Zoölogy and Entomology, Mathematics, Engineering, and Drafting. Every facility for advancement in the several arts taught at the College will be given such students, though they are not required to pursue industrial training while in such courses.

Degrees.—The degree of Bachelor of Science is conferred upon students who complete the full course of four years and sustain all the examinations.

The degree of Master of Science is conferred in course upon graduates who comply with the following conditions:—

1. Each candidate shall furnish evidence satisfactory to the Faculty of proficiency in at least one of each of the groups of arts and sciences here named.

Arts:—

Agriculture.
Horticulture.
Engineering.
Architecture and Designing.
Domestic Economy.

Sciences:—

Botany.
Chemistry.
Zoölogy.
Entomology.
Physics.

2. Each candidate shall present for consideration by the Faculty a satisfactory thesis, involving original researches in line with one or the other of the courses pursued as above, and shall deposit a perfect copy in the College Library.

3. Application to the Faculty for sanction of the lines of study and research selected should be made as early as the first day of November, and the subject of the thesis must be settled upon as soon as the first day of January preceding the Commencement at which the degree is expected.

4. Candidates must be from graduates of three or more years' standing, unless a post-graduate course of one year or more has been pursued at this College, in which case the second degree may be conferred two years after graduation.

Outlines of direction for study and research in various arts and sciences, with special adaptation to the wants and opportunities of individual applicants, will be furnished, at request, to all graduates; and Professors in charge will gladly aid by correspondence in any researches undertaken.

The degree of Master of Science may be conferred upon the graduates of other colleges, of like grade and having similar objects with our own, on the following conditions:—

1. The applicant for the Master's degree must be a graduate of at least three years' standing, and a resident of Kansas.

2. His post-graduate study shall have been in line with that required of graduates of this College, as published in our Catalogue.

3. He must make application for the degree on or before the first day of January preceding the granting of the same. The application must be accompanied with a statement of his course of study, the work upon which the claim for the degree is based, and the subject selected for his thesis.

4. By April 1st, an abstract of the thesis shall be submitted to the Faculty.

5. Before May 15th, the applicant shall present himself for examination. The examination shall be thorough and extensive, and shall be conducted by a special committee of the Faculty.

Outline of Instruction.

Agriculture.—*Second Year.*—History of agriculture, showing the successive steps by which the art has attained its present position. History and characteristics of breeds: their adaptation to the varying conditions of soil, climate, and situation; study of the forms of animals, as shown by the different breeds belonging to the College. The relation of stock-raising to general farming. Cultivation of hoed crops: management of corn and roots with reference to stock-feeding and the growth of the finer grains. The growth of the "tame grasses" in Kansas: the best sorts for the State, and their management, as shown by experience on the College Farm and elsewhere. Implements of simple tillage: mechanical principles involved in their construction. Application of labor. Draught: different adjustments, as affecting draught; use of the dynamometer. Plows for soil and subsoil. Drainage: soils that need draining; how to lay out a system of drains.

Fourth Year.—General principles governing the development of domestic animals: the laws of hereditary disease,—of normal, abnormal and acquired characters; atavism; correlation in the development of parts; in-and-in breeding and cross-breeding; influences affecting fecundity. The selection and arrangement of the farm with reference to the system to be pursued. Rotation of crops: general advantages of a rotation; the best rotation for the distribution of labor, production of manure, and extermination of weeds. Planning farm building,—barns, piggeries and stables. Manure: how

best housed and applied; composting; commercial fertilizers. Agricultural experiments; field and feeding experiments. Stock-feeding and meat production: stall-feeding; soiling. In this, Miles's Stock-Breeding is supplemented by a course of lectures.

Veterinary Science.—Short courses of lectures in general principles of veterinary science are provided for young men of the second and third years.

Books of Reference.—Journal of the Royal Agricultural Society of England, Morton's Cyclopedic, Low's Practical Agriculture and Domesticated Animals, Fleming's Veterinary Obstetrics, Ribot on Heredity, Farmer's Calendar, Allen's American Farm-Book, The Complete Grazier, Stephens's Book of the Farm, Thomas's Farm Implements, Waring's Draining for Profit and Health, the Reports of our own and other State Boards of Agriculture, and Shorthorn, Scotch Polled, Jersey, and Berkshire Herd-Books.

Horticulture.—It is the aim to teach this art from a botanical basis. The student applies his knowledge of the prime facts in botanical physiology to the various operations of the nursery, orchard, and farm. Barry's Fruit Garden is used, supplemented by a series of lectures upon the following topics, among others: The scope of horticulture. General principles of propagation,—by buds, by seeds. Production of improved varieties,—by careful selection of seeds, by interfertilization of known kinds. Perpetuation of valuable sorts of fruits by bud propagation,—budding, grafting, layering, etc. The important points in nursery manipulation. The orchard: conditions of site, soil, exposure, elevation. Special treatment of different kinds of fruit trees. Pruning. Gathering and storing fruits. Small-fruit culture; list of varieties suitable for Kansas planting. Vegetable garden: selection and preservation of seeds; planting and transplanting. The management and use of hot-bed and cold-frame. Forest plantations. Wind-breaks. Hedges. Trees and shrubs for ornamental planting.

Books of Reference.—The horticultural works of Downing, Warder, Fuller, Thomas, Loudon, Henderson, and other standard authorities. The Horticultural Reports of the States of Kansas, Michigan, Illinois, Iowa, Missouri, Massachusetts and others. In Landscape Gardening, the works of Downing, Weidenmann and Kemp.

Botany.—During the College course two terms are given to the study of Botany.

Elementary Botany—In the spring term of the first year, the organs of plants are first studied, after which the minute anatomy is briefly considered. This is followed by a study of vegetable physiology. The classification of plants and vegetable products and their uses are other important topics of the course. During the latter part of the term, a number of flowers are analyzed, and a few plants collected and prepared for the herbarium. Each student is required to provide himself with a pocket lens, under the direction of the Professor

in charge. Text-book, Kellerman's Elements of Botany and Plant Analysis.

Advanced Botany.—In the winter term of the fourth year, the minute structure of plants, as well as vegetable physiology, is studied more fully. This includes an examination of the vegetable cell, its parts, modifications, and products, and of tissue as presented in its various forms. This is made the basis for more detailed work on special subjects, among which may be mentioned germination, development of tissues, protoplasm, starch, parasitic fungi,—especially the moulds, smut, rusts, etc., and other cryptogamic plants. Each student has the use of a compound microscope, and works two hours daily in the botanical laboratory. While this course is intended primarily to furnish a foundation for applied botany in horticulture and agriculture, it also affords, to some extent, the advantages of systematic observation and original investigation. A good herbarium and a large greenhouse are drawn upon for material for study.

Books of Reference.—The works of Sachs, Gray, Lesquereux, Sullivant, Englemann, Tuckerman, Cook, Berkeley, Darwin, Wolle, Bessey, and others.

Chemistry.—*Inorganic Chemistry*, which occupies fourteen weeks of the second year, includes a consideration of chemical force and of the laws of chemical combination, with nomenclature and formulas, and a careful study of the history, manufacture, physical, chemical, and physiological properties, tests and uses of the various elements and their compounds. Especial attention is given to those substances having extended application in the arts. In addition to the usual lecture-room experiments, the student repeats, as far as practicable, all this experimental work at his private work-table.

Organic Chemistry comprises a six-weeks' course of lectures upon the preparation and properties of those organic substances most useful to man.

In *Chemical Analysis*, each student has his stand in the Qualitative Laboratory, completely furnished with apparatus and chemicals for his own use. His work includes the analysis of more or less complex mixtures of chemicals, minerals, ores, soils, mineral waters, well waters, etc. The time given to this work is two hours daily for eleven weeks.

Agricultural Chemistry.—This includes a thorough consideration of the application of chemical principles to the economy of the farm: the origin and formation of soils; the classification and composition of soils; the analysis of soils and their adaptation to purposes of production; the composition and use of manures; composting; chemistry of farm operations,—such as plowing, fallowing, draining; chemistry of plant growth. Text-book, Elements of Agricultural Chemistry by Johnston and Cameron.

Books of Reference.—Roscoe, Schorlemmer, Miller, Storer, Cooke, Strecker, Bloxam, Remsen, Frankland, Fresenius, Thorpe, Blyth,

Prescott, Wanklyn, Tucker, Naquet, Paul and Payen, Wagner's Technology, Crookes's Metallurgy, Richardson and Watt's Technology, Muspratt's Chemistry, Watt's Dictionary, Sutton's Volumetric Analysis, Crookes's Select Methods, Journal of the Royal Agricultural Society, Reports of experiment stations, current journals.

Zoology.—In this study, Orton's Zoölogy has been adopted as the text-book. The intention of the course is to familiarize the student with the characters of some type in each class, and then, by comparative study, with the chief modifications of the type chosen. Especial attention is given to comparative anatomy and physiology. A good collection of animals, birds, reptiles, fishes, both mounted and alcoholic, a collection of invertebrates in alcohol, and a fine collection of conchological specimens, are among the means of illustration. Dissection and work with the microscope accompany the study.

Books of Reference.—A selection of standard works, including those of Agassiz, Huxley, Gegenbaur, Balfour, Foster, Darwin, Wallace, Frey, Packard, Cones, Baird, Jordan, and others.

Entomology.—This science is studied with special reference to its economic relations with agriculture and horticulture. A brief course in the principles of classification is followed by a more extended study of the life-history of beneficial and injurious insects, and means of encouragement of one and the control of the other.

The instruction is presented in the form of lectures. Illustrations are furnished from the individual collections of the students, and from the entomological collection belonging to the College. Charts and drawings from nature are used to illustrate points of value in classification. The pocket lens used in botany is required in this study.

Books of Reference.—Packard's Guide to the study of insects, Harris's Insects Injurious to Vegetation, Riley's Reports, LeBaron's Reports, Fitch's Reports, Thomas's Reports, Reports of the U. S. Entomologist, Transactions of the American Entomological Society, Canadian Entomologist, Psyche, and others.

Mineralogy.—For six weeks in the second year, two hours a day are given to mineralogy. This includes the study of crystallography, with the properties, forms, and uses of the principal minerals of the United States. Blow-pipe analysis forms an important part of the course, each student being required to identify and name a large series of minerals. The pocket lens required in botany classes is used in this study. Text-book, Dana's Mineralogy and Lithology.

Books of Reference.—The works of Dana, Plattner, and Elderhorst.

Geology.—This includes a general consideration of the earth's features, the constitution of rocks, and the arrangement of rock-masses; the causes or origin of events in geological history; the order of succession in the strata of the earth's crust, and of the organisms that existed, and of the changes that were going on during the for-

mation of each stratum. Prominence is given to facts having an economic bearing. The formation of soils and deposits of valuable minerals, especially in Kansas, are considered. LeConte's Compend of Geology is used as a text-book.

Books of Reference.—The works of Dana, LeConte, Geike, and the various geologic surveys.

Physics and Meteorology.—Two terms' work gives an opportunity for experimental study of the laws of sound, heat, light, electricity, and magnetism; the constitution of the atmosphere; the measurement of temperature and humidity; atmospheric pressure. Text-books, Atkinson's and Ganot's Physics and Loomis's Meteorology. This course also includes a careful study of instruments and methods employed in taking meteorological observations.

Books of Reference.—The works of Deschanel, Tyndall, Faraday, Helmholtz, Grove, Gordon, Thompson, Stewart, Siemens, Maxwell, and Miller.

Anatomy and Physiology.—Human anatomy is made the basis of a thorough study in physiology and hygiene. This includes such subjects as: Digestion and food; poisons and antidotes; circulation of the blood; respiration and ventilation; secretion and excretion; the nervous system; and the special senses. The course embraces, to some extent, Comparative Anatomy and Physiology, affording preparation for the study of Stock-breeding and Zoölogy. Martin's Human Body is used as a text-book.

Books of Reference.—Dalton's Human Physiology, Carpenter's Human Physiology, Flint's Physiology of Man, and Gray's Anatomy.

Special Hygiene.—To the ladies of the third year, a course of daily lectures is given upon the laws of life and health. The course extends over a period of ten weeks, and covers questions pertaining to personal health, and the health of the household,—such as food, air, exercise, clothing, temperature of rooms, and care of sick-room.

Books of Reference.—Health and its condition (Hinton), Dictionary of Hygiene (Blyth and Tardien), Hygiene and Public Health (Buck).

Household Economy.—A series of lectures to the ladies of the second year continues through a term of twelve weeks. These cover the subjects of marketing, the chemistry of cooking, order, neatness, and beauty in housekeeping, and comfort of a family. The class spends one hour each day in the kitchen laboratory, and cooking is done by each student.

Books of Reference.—The writings of Dr. Pavy, Miss Acton, Miss Dodds, Miss Parloa, and Miss Youmans.

Arithmetic.—In the first year, one term is given to a general review of arithmetic. Practical measurements and the various applications of percentage receive special attention. Such forms of solution are required as lead to logical analyses. Two objects are aimed at in this course: First, to give a practical knowledge of the compu-

tations used in ordinary business life; second, to secure the mental discipline so necessary to the study of higher mathematics. Text-book, Brooks's Union Arithmetic.

Book-Keeping and Commercial Law.—Beginning with a simple cash account, Book-keeping is developed through all the principles of single- and double-entry. Considerable time is given to those forms best adapted to farm and business life. Each student provides a full set of blanks, and keeps a regular set of books, in which accuracy of calculation and posting, and neatness of execution, are just as essential as correct understanding of the principles.

In addition to this term's work in Book-keeping, a practical course in Commercial Law is given, including contracts, sale of personal property, negotiable paper, interest, partnership, bailment, common carriers of freight and passengers, real estate, and the forms of business paper.

Books of Reference.—Townsend's Commercial Law, Mayhew, Duff, and Bryant, Haigh's Manual of Farm Law.

Algebra.—Two terms are devoted to the study of Algebra. In the first, the student is thoroughly drilled in algebraic notation, the fundamental rules, the secondary operations of composition and factoring, and the simple form of the equation. The second term is devoted to the various transformations and applications of the equation,—simple quadratic, radical, etc. The equation thus becomes a most important instrument for solving the problems of practical life in which quantity is an item; for demonstrating theorems in geometry and trigonometry; and for the construction of formulas for the use of the engineer and artisan. Text-book, Wentworth's Algebra.

Geometry.—In geometrical drawing of the first year, the student has already become familiar with geometrical forms and their construction. The winter term of the second year is devoted to plane geometry. Half of the spring term is then given to solid and spherical geometry. Throughout the course, practical problems involving the principles demonstrated are given to the class. Text-book, Wentworth's Geometry.

Trigonometry and Surveying.—The principles of plane trigonometry involved in mensuration and surveying are first mastered. Surveying includes: theory, adjustment, and use of instruments; history and methods of U. S. Government surveys; areas of land; dividing land; retracing old lines; platting; topographical surveying; railroad surveying; leveling,—section and cross-section; field practice with transit, compass, chain, level, and rod. A map of the College farm, the data of which are gathered during the fall term, is drawn by each student during the winter term. Text-book, Ray's Trigonometry and Surveying.

Books of Reference.—Gillespie, Reports of U. S. Land Office.

Mechanics and Engineering.—A careful consideration of the laws of motion and force, as exhibited in machines and various phenomena of nature, occupies a single term. Another term is given to the study of proper materials for buildings, their construction and durability; forms of roofs and bridges; care and use of machinery; and roads and road-making. Drafting is an essential feature of the work. Text books, Peck's *Mechanics*, Mahan's *Civil Engineering*.

Books of Reference.—Rankine's *Mechanics*, Nystrom's *Mechanics*, Badlitt's *Mechanics*, Hand-books of *Engineering*, Knight's *Mechanical Dictionary*.

Drawing.—This study is required in four terms, of which two are in the first, one in the second, and one in the third year.

First term.—Daily lessons for fourteen weeks. Definitions of lines and Geometrical figures; judging and measuring lines and angles; construction of perpendiculars to given lines, of triangles, four-sided figures and polygons, of the circle and its secant lines, of ellipses, ovoids, ovals, parabolas, hyperbolas, and various geometrical ornaments; use of drawing board, T-square and water-colors; conventional representation of building materials. Prof. Morse's first two books on *Mechanical Drawing* are used as text books. The College furnishes drawing-board, T-square, triangle and water-colors, but each student is required to have a drawing-pen and a pair of compasses with attachments.

Second term.—Free-hand Drawing three hours a week for twelve weeks. After the study of Nos. 3 and 4 of White's *Text-books of Art Education*, drawing from the object is taken up. The models used are geometrical solids, and objects of utility and beauty whose forms bear close relationship to geometrical types. The students are led to recognize the facts, relations, and principles involved in the apparent form of the object, to note the distribution of light, shade, shadow, and reflection on the same, and deduce the general principles which the observation and comparison of these appearances are found to establish. Lectures on color, principles of design, and history of ornamentation are occasionally given.

Third term.—Mechanical Drawing five weeks. Projection of the straight line and circle; intersection of geometrical solids; construction and development of helices. Principles of isometrical projection. Principles of shades and shadows. Books 3 and 4 of Morse's *Mechanical Drawing* are used as text-books,

Fourth term.—Mechanical drawing twice a week for ten weeks. Principles of parallel, angular, and oblique perspective. Intersections of curved and plain surfaces in perspective. Shaded perspectives. Books 5 and 6 of Morse's *Mechanical Drawing* are used as text-books.

During the winter term of the third year, each student is required to draw, color, ink, and letter a large map delineating the surveys made during the fall term.

Students who show special aptitude are encouraged to take drawing as a fourth study during any part of the course, and given every opportunity to fit themselves for the drafting office or for special art schools. The instruction includes an extended course in free-hand drawing, shading, coloring, architectural and Mechanical drawing, shading, coloring, architectural and mechanical drawing, supplemented by a course of reading on art topics.

The graphic work of the different classes and special students is retained by the department for exhibition during Commencement, after which it is returned.

Books of Reference.—Warren's Descriptive Geometry, Walter Smith's Manual of Art Education, Ware's Perspective, Guild's American Stair-Builders, Andre's Hand-Book of Topographical Drawing, Davies's Shades and Shadows, Gwilt's Cyclopaedia of Architecture, Prang's Art Atlas, Lübke's History of Art, Steinhauser's Room Decoration, Van Bezold's Theory of Color.

English Language and Literature.—*First Year.*—The study of English Grammar is made to serve directly in securing clear perception and correct expression. Such practice in analysis and parsing as may give the student a clear idea of the English sentence in all its parts is associated with frequent exercises in expression and criticism. Under English Structure is included a careful study of words and their elements,—roots, stems, prefixes, and suffixes. The most fruitful roots from the Saxon, Latin, and Greek are learned, and also the laws governing the changes in the letters of roots in forming derivatives. Lectures are given upon the origin and history of the English Language. At the same time, the daily exercises are made a means of training in spelling, pronunciation and definition. Text-books, Reed & Kellogg's Higher English Lessons, Swinton's Word Analysis.

Principles and methods in English Composition are then taken up, with Kellogg's Rhetoric as a text-book. Numerous exercises and revisions familiarize the student with the essentials of neat, legible manuscript, and clear, forcible expression.

Each class meets weekly for drill in elocution and composition.

Third Year.—One term is given to the study of Higher Rhetoric, embracing the principles of clear explanation and convincing argument, as well as the outlines of sound criticism, as presented in A. S. Hill's Rhetoric. This is followed by a term spent in the history of the English language and literature, with abundant illustrations from the best authors.

Students are led in this way to appreciate the power of our mother tongue, and at the same time to gain a slight acquaintance with the best thoughts of the world. Students are encouraged and directed in the use of the College Library, and are under constant oversight in the expression of their thoughts in writing. Original declama-

tions, carefully prepared and delivered before the students and Faculty, make a part of the drill in the higher classes.

In the course for young women, the first term of the fourth year gives training in the elements of criticism and good taste by a critical study of famous works in English and American literature.

Books of Reference.—Goold Brown's Grammar of English Grammars, Marsh's Lectures on the English Language, Whitney's Life and Growth of Language, DeVere's Studies in English; Allibones's Dictionary of Authors, Hallam's Literature of Europe, W. D. Adams's Dictionary of English Literature, C. K. Adams's Manual of Historical Literature, Whately's Rhetoric, Fowler's English Grammar, Trench on the Study of Words, Chambers's Cyclopædia of English Literature, Phillips's English Literature, Tyler's American Literature.

History and Political Economy.—In the first year, the study of United States History occupies one term, and special attention is given to the form and growth of the government under which we live.

In the third year, a term is given to General History, with Swinton's Outlines as a text-book. The world's progress in science, literature, and art is carefully traced, with its causes.

In the fourth year, a careful study of the Constitution of the United States, with Cooley's Principles of Constitutional Law as a text-book, shows the general principles of government, its means and methods, illustrated by historical references.

The study of Political Economy, in a full term of the fourth year, gives a fair presentation of subjects connected with production, distribution, and consumption of wealth. Chapin's Wayland's Elements is the book of daily reference, while the instruction is given by lectures. Pains is taken to compare conflicting views, and point out sources of information on all sides of vexed questions, without bias or prejudice.

Books of Reference.—Guizot's Civilization, Bancroft's United States, Hume's, Macaulay's and Green's England, Guizot's France, and a good library in general history. In Political Economy, works of Adam Smith, Mill, Fawcett, Cairnes, Walker, Bowen, Carey, and Thompson.

Logic and Philosophy.—The art of reasoning correctly is aided by a study of systematic logic, both deductive and inductive. Special prominence is given to methods for exact observation and experiment, and correct principles for classification. The previous researches and experience of the student are made to illustrate these principles. Text-book, Jevons's Lessons in Logic.

A short course in Psychology gives the general principles of intellectual and moral philosophy. Perception, understanding, reason, feeling, and volition are topics of explanation and analysis. Theories of right and wrong, and correct principles of action, are made the

means of a clear understanding of individual rights and duties. Hopkins's Outline Study of Man forms the basis of the course.

Books of Reference.—Mill's, Jevons's, and Fowler's Logic, Bascom's Psychology, Porter's Human Intellect, Fairchild's Moral Philosophy, Cousin's "The True, The Beautiful, and The Good," and the works of Spencer, Hamilton, and others.

Industrial Arts.—The training in these departments is designed to be systematic and complete in each, so that the student, following a single line diligently through the four-years' course, gains the essentials of a trade and a reasonable degree of skill. Those who wish only a general acquaintance with the arts can take shorter courses in several of them; but all are to select with a definite purpose. In the established course, young men are required to take the regular term in the carpenter shop, and on the farm and gardens, whatever the industrial chosen; young women are required to give one term to sewing, one to practice in the kitchen laboratory, and one in the dairy.

AGRICULTURE AND HORTICULTURE are required of young men as industrials during one term of the second year and one term of the third year. In these, practice is made to illustrate and emphasize the teaching, and cover essentially the same ground.

COOKING.—During the winter term, the young ladies who have lectures on Household Economy are required to cook one hour per day. They are taught various methods of making the substantial articles of food, as well as allowed to spend some time on the dainty dishes. During the term, they have practice in waiting on the table, in serving guests, and in arranging for evening companies, thus putting into immediate practice the lectures of each day.

DAIRYING.—During the spring term, daily instruction and practice in the different branches of dairying are given the ladies of the second year by the Instructor in Household Economy. Here the regular daily work is supplemented by a short course of lectures intended to explain the best practice in the arts of butter- and cheese-making, and to give the reasons therefor. The following topics cover, in the main, the instruction given the class: Influences affecting the quality and quantity of milk; butter-making; creameries; "deep" and "shallow" setting systems; packing and preserving butter; the household and factory systems of cheese-making.

WORK IN WOOD AND IRON.—All students enrolled in classes for wood-work will be given lessons in sawing and planing to test their skill, and advanced as fast as their work will warrant. Students who desire to learn the trade of carpentry will be given work in the direct line of that trade as far as possible. Work on roofing, framing, and bridge-building will be done by models. Careful instructions will be given in sharpening, fitting up, and taking general care of all tools required in the work. Carpentry is required of the young men during

one term of the first year, with especial reference to facility in use of common tools.

In iron work, instruction is given in ordinary work,—forging, filing, tempering, etc.

SEWING.—Young ladies are taught in all ordinary forms of sewing with needle and machine, and in cutting, fitting, and trimming dresses and other garments. A straight-line system of cutting and fitting is taught, and systems are furnished to the students at wholesale rates. They may furnish materials, and work for their own advantage during the hour of practice, under the direction of the Superintendent. One term of sewing is required before the completion of the first year.

PRINTING.—Two courses are pursued in this art. In one the student is taught the implements or tools used in typography, and how to use them; composition and imposition; correcting proof; technical terms; presses and their workings; and the general duties of a first-class workmen. Every one is encouraged in the study of the rise and progress of printing and related arts. Habits of accuracy and thoroughness are required, in order to advancement. The second course of lessons, alternating with those in the first, embraces instruction in spelling, capitalization, syllabication, punctuation, proof-reading, preparation and criticism of essays, and such other work as will make the student accurate and expert in language. Wilson's Punctuation is the text-book; but much of the instruction is oral,—such as grows out of the every-day experience of the office.

Admirable drill is furnished by the *Industrialist* to all, but especially to those who take the full course. The printing which the departments of the College require gives to the advanced student a fair knowledge of the principles and practice of job work.

Books of Reference.—MacKellar's *American Printer*, Harpel's *Typograph*, *The Inland Printer*, Rounds's *Printers' Cabinet*, Ringwalt's *Encyclopedia of Printing*, DeVinne's *The Invention of Printing*, DeVinne's *Printers' Price List*, and standard works on grammar and rhetoric.

TELEGRAPHY.—The course of training involves for beginners the characters that compose the alphabet, and combinations of these characters into words and sentences,—attention being paid to spelling and to short and precise expression in messages,—abbreviations, signals, forms of messages, train orders, reports, etc. To the more advanced is given regular line business,—as press reports, messages, cipher messages, and orders in all forms used by prominent telegraph companies, together with the necessary book-keeping, upon exact copies of blanks in actual use, thus giving the student an understanding of the work of an operator. A portion of the time is devoted to instruction in the use and management of lines, batteries, instruments, etc. The elementary principles of electricity, magnetism, and electro-magnetism involved in telegraphy are taught and

illustrated by experiments. The more recent inventions relating to the art are discussed and explained. Pope's Hand-Book of the Telegraph is used as a text-book.

Books of Reference.—Prescott's Electric Telegraph, Morse's Telegraphic Apparatus, Culley's Telegraphy, and the works of DuMoncel, Clark & Sabine, Davis & Rae, Mandet, Jenkins, Harris, with the *Journal of the Telegraph* and the *Electrical Review*.

INSTRUMENTAL MUSIC.—Provision is made for the teaching of music upon instruments of all sorts. A full course upon the organ or piano extends over four years, including harmony and composition; but the students may take lessons for a single term if they choose. The College furnishes the instruments for daily practice, but the instruction is paid for at the usual rate, as given under "Expenses." Music may be the industrial for young women, unless some other is required in the course. Young men may take music in addition to their course, if able to keep up standing in classes.

Opportunity is given for students who are sufficiently advanced to join in the weekly rehearsals of the College orchestra or the Cadet Cornet band.

Vocal Music.—All students are furnished instructions in vocal music free of charge, under the direction of the Faculty. Classes meet on Mondays and Wednesdays for advanced pupils, and for beginners on Tuesdays and Thursdays, at 1:30 P. M. The advanced class shares in the music of public exercises during Commencement week. This study is taken up at the choice of the student, but regular attendance is required as at other classes until excuse is granted.

Arrangements for special voice culture may be made with the Professor in charge on reasonable terms.

Military Training.—During the second year, a course of twenty-six lessons is given. Fourteen of these are designed to show what an army is for, its relation to the country, and, in a general way, to describe its organization and duties. The remaining twelve are devoted to the consideration of Todd's "Campaigns of the Rebellion."

To those who desire it, an opportunity is given for practice in the ordinary infantry drills, including bayonet and sword exercise and target practice. Although drill is thus made optional, students are not allowed to take it for periods shorter than one term. To obtain a proper proficiency, however, one should take the tri-weekly drill for at least a year.

The College battalion is divided into companies, which are officered by students appointed each term by the Professor in charge with the approval of the President.

Arms and accoutrements are furnished by the Government, the students being required to keep such as they use in proper condition. Uniforms for use in drill are furnished by the College.

Means of Illustration.

AGRICULTURE.—Two farms of 215 and 100 acres, for the most part surrounded by durable stone walls, sub-divided into fields of variable size to suit the system of management.

A large variety of standard experimental grains in cultivation in fields and experimental plats.

A barn 50 by 75 feet, expressly arranged for experimental uses; and connected with it a general purpose barn, 48 by 96 feet, for grain, hay, horses, and cattle. Both buildings are provided with steam power and equipped with improved machinery for shelling, grinding, threshing, and steaming.

A piggery of six pens, with separate yards.

An implement house 22 by 50 feet, of two stories; and corn-cribs. Shorthorn, Aberdeen-Angus, Galloway, and Jersey cattle; Berkshire and Poland-China swine.

Farm implements of improved patterns.

Collections of grains, grasses, and forage plants.

Buildings, stock, and equipments are valued at \$24,000.

HORTICULTURE AND ENTOMOLOGY.—Orchards, containing 275 varieties of apples, 80 of peaches, 50 of pears, 16 of plums, 20 of cherries and 10 of apricots.

Small-fruit garden, with 200 varieties of small fruits, including blackberries, raspberries, gooseberries, currants and strawberries; and vineyard, with 100 varieties of grapes.

Forest plantation of 12 acres, containing twenty varieties of from ten to fifteen years' growth.

Ornamental grounds, set with a variety of evergreen and deciduous trees. Sample rows, containing about 150 varieties of ornamental and useful shrubs and trees, labeled.

Vegetable garden, with hot-beds and cold-frames and experimental beds. Practice rows for students' budding, grafting, cultivating, and pruning.

A well-planned and furnished green-house of three rooms, stocked with a collection of native and exotic plants.

Museum, containing a collection of woods from American forests, and a large series of specimens in economic and general entomology.

Value of property, exclusive of orchards and grounds, \$8,500.

CHEMISTRY AND MINERALOGY.—Eight rooms fitted with tables and apparatus for a class of eighty students in qualitative analysis, sixteen in quantitative analysis, including necessary facilities for assaying, with a mineralogical collection and general illustrative apparatus. Value, exclusive of building, \$6,500.

NATURAL HISTORY.—A capacious museum building, with class-room laboratories, and office attached. Extensive collections in botany, zoölogy and geology; apparatus, models, and illustrative preparations

and 17 compound microscopes for use of students. Value of collections, etc., \$6,000.

DRAWING.—Models, plaster-casts, patterns, charts, easels, and implements; valued at \$900.

PHYSICS AND ENGINEERING.—Physical apparatus, meteorological instruments, transits, compasses, levels, chains, models, etc. Some of the additions just made are Edelman's dynamo electric machine, with numerous accessories, syren, manometric flame apparatus, Rowland's diffraction plates, anemograph, sling psychrometer, soil and radiation thermometers, and other apparatus for the investigation of practical problems. The value of the whole is \$2,800.

KITCHEN LABORATORY, with ranges, cooking utensils, dining-room furnishings, dairy furniture; valued at \$450.

CARPENTRY AND BLACKSMITHING.—Carpenter shop, with separate benches and tools for forty-five students in each class, besides lathes, mortising machines, circular saws, band saws, planer, and general chest of tools for fine work. Power furnished by a ten-horse-power Atlas engine.

Shops for iron work, with forges, vises, drills, etc.

Inventory of material and apparatus in both shops, \$5,000.

PRINTING.—Office, with twenty-five pairs of cases, large fonts of nonpareil, brevier, long primer, and small pica type; a good assortment of job type, a Country Babcock press, a Gordon jobber, and a paper cutter. Value of equipment \$3,500.

TELEGRAPH OFFICE.—With five miles of line, connecting thirty branch offices, and as many instruments; and a Remington typewriter. Inventory, \$1,000.

SEWING ROOMS, with six machines, models, patterns and cases; worth \$550.

MUSIC ROOMS, with four pianos, four organs, and other instruments; valued at \$1,500.

A LIBRARY, carefully selected and catalogued, containing 7,000 volumes. A reading-room is maintained in connection with the library, where may be found on file forty-five of the leading literary, scientific, technical, and agricultural periodicals, and several hundred newspapers, including the principal daily and county papers from all parts of the State. Value of library, \$11,500.

ARMORY, containing one hundred stands of arms (breech-loading cadet rifles, calibre .45), with accoutrements; also swords, uniforms, etc. Value, exclusive of arms, \$600.

General Duties and Privileges.

General good conduct, such as becomes men and women anywhere, is expected of all. Every student is encouraged in the formation of sound character by both precept and example, and expected "upon honor" to maintain a good repute. Failure to do so is met with prompt dismissal. No other rules of personal conduct are announced.

Classes are in session every week-day except Saturdays, and no student may be absent without excuse. Students enrolled in any term cannot honorably leave College before the close of the term, unless excused beforehand by the Faculty. A full and permanent record of attendance, scholarship, and deportment shows to each student his standing in the College. After each term's examination, during the first year of attendance, a report of advancement is made to parents; and any student, upon leaving College at the close of a term, may receive a certificate of standing.

Chapel exercises occupy fifteen minutes before the meeting of classes each morning, and unnecessary absence from them is noted in the grades.

Every Friday, at 1:30 P. M., the whole body of students gather for a lecture from some member of the Faculty, or for the rhetorical exercises of the third- and fourth-year classes. On each Wednesday, at the fifth hour, all the classes meet for exercises in elocution and correct expression.

There are three prosperous literary societies, two of them of many years' standing. All meet weekly, in rooms set apart for their use. The *Alpha Beta* is open to both sexes, and holds its meetings Friday afternoons. The *Webster* and the *Hamilton* admit to membership gentlemen only, and meet on Saturday evening.

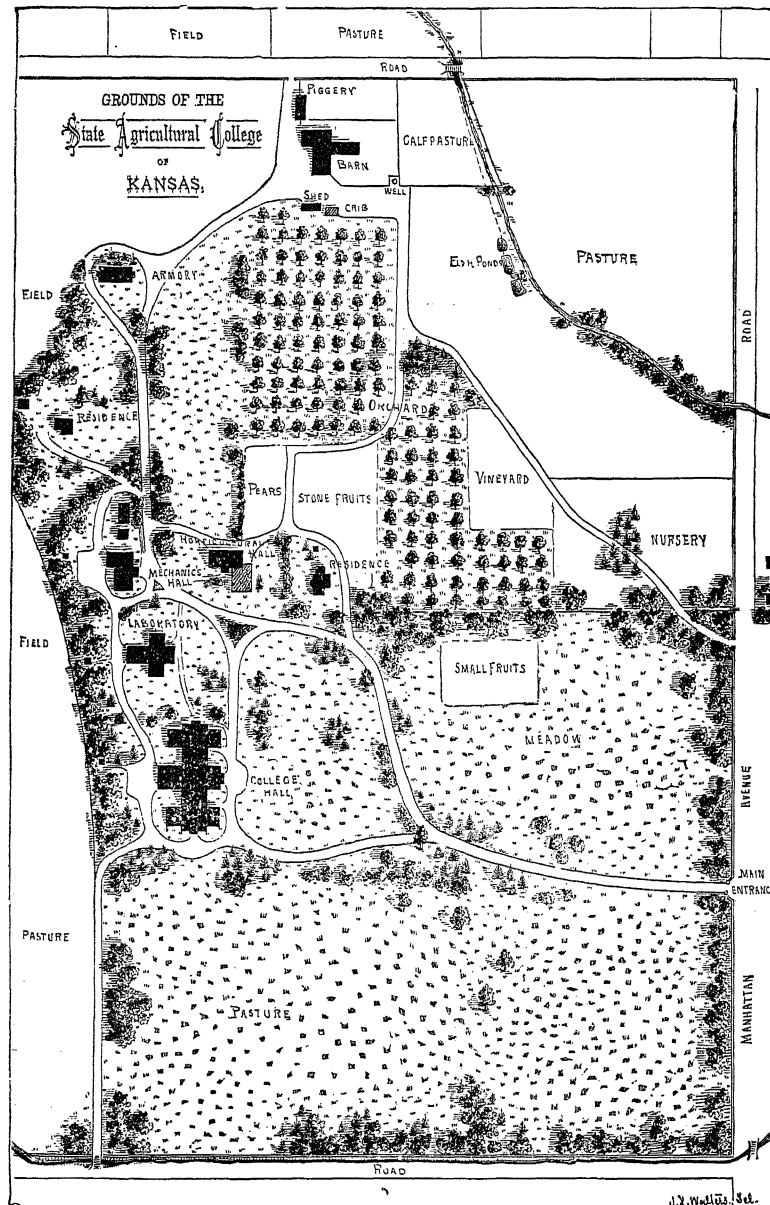
The Scientific Club, composed of members of the Faculty and students, meets in the Chemical Laboratory on the first Friday evening of each month.

Every Friday evening a students' prayer-meeting is held in a College Society Room, led by a member of the Faculty. On the Sabbath, students are expected to attend services at least once in the different churches of the city.

Branches of the College Y. M. C. A. and Y. W. C. A. hold weekly meetings at the College.

Occasionally during each term the College Hall is opened for a social gathering of Faculty and students, in which music, literary exercises, and friendly greeting find place.

Public lectures by prominent men of the State are provided from time to time, as opportunity offers. All are free.



Grounds and Buildings.

The College grounds and buildings, occupying an elevation at the western limits of the city of Manhattan and facing towards the city, are beautiful in location. The grounds include an irregular plot in the midst of a fine farm, with orchard, vineyard, and sample gardens attached. The grounds are tastefully laid out and extensively planted according to the design of a professional landscape gardener, while well-graveled drives and good walks lead to the various buildings. All of these are of the famed Manhattan limestone, of simple, but neat, style of architecture, and admirably suited to their use. All recitation rooms are excellently lighted and ventilated, and all are heated by steam or hot water. The buildings stand as indicated in the plot accompanying the following description:—

College, 140 by 250 feet in extreme dimensions, arranged in three distinct structures, with connecting corridors. This building contains in its two stories and basement, offices, reception room, cloak rooms, studies, chapel, library, reading-room, model kitchen and dairy, sewing-room, society-rooms, and twelve class-rooms.

Chemical Laboratory, one story, 26 by 99 and 46 by 75 of floor space, in form of a cross. It contains eight rooms, occupied by the Department of Chemistry and Mineralogy.

Mechanics' Hall, 39 by 103 feet, of two stories, occupied by Carpenter shop, Telegraph and Printing offices, and Music rooms.

Horticultural Hall, 32 by 80 feet, one story and cellar, having cabinet-room, class-room, work-room and storage, with green-house attached.

Two stone dwellings, occupied by the President and the Professor of Agriculture.

Museum Building, 46 by 96 feet, and two stories. This building, which has served many purposes, is now fitted for armory and drill-room below, and for class-room, laboratory, and museum of the Department of Natural History.

The Barn is a double but connected stone structure, 50 by 75 feet in its greatest easterly and westerly extension, and having an annex 48 by 96 feet at right angles with this. A basement, having stables for seventy-five head of cattle, silo, engine-room, and granaries underlies the entire structure.

The blacksmith shop, lumber house, implement house, piggery, and various out-buildings are of wood.

Expenses.

Tuition is free, and no general fee for incidental or contingent expenses is charged. In a few special departments of instruction, the following payments are made in advance to the Secretary:—

In the term of analytical chemistry, students pay \$3 for the chemicals and apparatus used in their laboratory practice and analysis.

In the printing office, young men, in their first year, pay \$3 a term for office expenses. Advanced students have the use of the office for the work performed during the industrial hours.

In Telegraphy, young men pay \$3 a term for office expenses.

Young women are furnished both printing and telegraphy free of expense, these two offices, with the Sewing and Cooking Departments, being provided especially for their industrial training.

Lessons in instrumental music, two a week, are from \$10 to \$14 per term, according to its length; one a week, \$6 to \$8.40. One-half is to be paid to the instructor in charge with the first lesson, the other half at the middle of the term.

The cost of text-books at the book-store is, for the first year, about \$4 a term; for the second year, \$2.75; for the third year, \$7.50; and for the fourth year, \$5.50.

Board and washing are not furnished by the College. Board, with furnished rooms, can be procured in private families at from \$2.75 to \$4 per week. Some students board themselves at even less cost; and rooms for the purpose can be obtained at a rent of from \$1 to \$2.50 a month. Washing costs from \$0.50 to \$1.00 a dozen pieces.

Ordinary expenditures, aside from clothing and traveling expenses, range from \$100 to \$200 a year.

Labor and Earnings.

Every encouragement is given to habits of daily manual labor during the College course. Only the one hour of daily practice in the industrial departments is required; but students are encouraged to make use of other opportunities for adding to their ability and means.

All labor at the College is under the direction of the Superintendents of the departments, and offers opportunity for increasing skill and efficiency. In regular weekly statements, the students are required to observe business forms and principles, showing from their daily account when and where the work was performed.

The shops and offices are opened afternoons and Saturdays for the accommodation of skilled students in work for their own advantage.

Everywhere the student who works wins respect; and it is a matter of pride to earn one's way as far as possible.

The labor of the students in the industrial departments is principally a part of their education, and is not paid for unless the student is employed—outside of required hours of labor—upon work for the profit of the College. Students are so employed upon the farm, in the the gardens or the shops, and about the buildings. The labor is paid for at rates varying with services rendered, from eight to ten cents an hour. The Superintendents strive to adjust their work to the necessities of students, and give them the preference in all tasks suitable for their employment. So far as practicable, the work of the shops and offices is turned to account for their benefit; and the increasing extent of the grounds and sample gardens brings more of such labor. The monthly pay-roll for the past year ranges from \$325 to \$400.

Many students obtain work in the city or upon neighboring farms, and so pay part of their expenses. In these ways a few students are able to earn their way through College. The amount so earned will vary according to the tact and zeal of the student. The majority must expect to provide by earnings outside of term-time, or from other sources, for the larger part of their expenses. The long summer vacation of three months offers opportunity for farm or other remunerative labor; and no one need despair of gaining an education if he has the ability to use his chances well.

Terms of Admission.

Applicants for admission at the beginning of the year, in September, must be at least fourteen years of age, and able to pass a satisfactory examination in reading, spelling, writing, arithmetic, including percentage and interest, geography, and elements of English grammar. Those applying later in the term must show sufficient advancement to enter the classes already in progress. Every effort should be made to begin with the first day of the term, in order to advance with the class from the first.

Applicants of mature age who, for lack of advantages, are unable to pass the full examination, may be received on special conditions.

Applicants for advanced standing in the course must pass examination in all the previous studies of the class to be entered; but, if they have pursued such studies in other institutions of similar rank, they may receive credit for their standing in those institutions upon presenting a certificate from the proper officer, showing that their course has been equivalent to that given here.

The following questions may serve as samples of the usual examinations for admission:—

GRAMMAR.

1. Define grammar, parsing, analysis.
2. What parts of speech have declension? comparison? conjugation?
3. Write a declarative, an interrogative, an imperative, and an exclamatory sentence.
4. Write a simple, a complex, and a compound sentence.
5. Correct, if necessary:—
 I seen him when he run.
 Everybody must attend to his work.
 I knew it to be he.
6. Parse each word: He gave me a book.
7. Analyze the following sentence:—
 He who is diligent will succeed.
8. Write an essay of fifty words on the subject, *Winds*.

ARITHMETIC.

1. Bought 60 cows at \$33 apiece, and 47 at \$28 apiece; what was the total cost? The average cost?
2. Bought land for \$8870 and sold it at \$31 per acre, losing \$248; how many acres were there?
3. Reduce 45 miles, 16 rds., 3 yds. to feet.
4. Reduce 155,600 ounces to tons.
5. A box is 8 feet long, 6 feet wide, and 3 feet 4 inches deep, inside measurements; how many bushels of wheat will it hold? How many bushels of potatoes?
6. If $2\frac{1}{2}$ lb. of honey cost \$0.75, what cost $9\frac{1}{4}$ lb.?
7. Find the Lowest Common Multiple and Greatest Common Divisor of 84, 96, and 144.
8. Find the sum of $9\frac{1}{2}$, $6\frac{1}{2}$, $8\frac{3}{4}$, $3\frac{1}{4}$.
9. If a horse was sold for \$300 at a loss of 20 per cent, what was the actual loss?
10. Find the interest on \$840 from March 1st, 1886, to Sept. 8th, 1886, at 7 per cent.

Business Directions.

Loans upon school-district bonds are to be obtained from the Loan Commissioner.

College Lands and all business connected with their sale are in charge of the Land Agent.

Bills against the College should be presented monthly, and, when audited, are paid at the office of the Treasurer in Manhattan.

All payments of principal and interest on account of bonds or land contracts must be made to the State Treasurer, at Topeka. Applica-

tions for extension of time on land contracts should be sent to the Secretary of the Board of Regents, at Manhattan.

The *Industrialist* may be addressed through Pres. Geo. T. Fairchild, Managing Editor. Subscriptions are received by Supt. J. S. C. Thompson.

Donations for the Library or Museums should be sent to the Librarian, or to Prof. Kellerman, chairman of Committee on Museums.

Questions, scientific or practical, concerning the different departments of study or work, may be addressed to the several Professors and Superintendents.

General information concerning the College and its work,—studies, examinations, grades, boarding places, etc.,—may be obtained at the office of the President or by addressing the Secretary.

Applications for Farmers' Institutes should be addressed, as early in the season as possible, to the President.

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1887-88.

FALL TERM.—*September 8th to December 17th.*

WINTER TERM.—*January 3rd to March 23rd.*

SPRING TERM.—*March 26th to June 6th.*

June 6th, Commencement.

1888-89.

FALL TERM.—*September 13th, College year begins.*